EXAMINATIONS COUNCIL OF ESWATINI
Eswatini General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

BIOLOGY **6884/02**

Paper 2 Structured Questions **October/November 2023**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided.
Write your answers in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs or rough working.
Do **not** use staples, paper clips, glue or correction fluid.
Do **not** write on the barcode.

Answer **all** questions.

You may use an electronic calculator.

You may lose marks if you do not show your working or if you do not use appropriate units.

The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
8	
Total	

This document consists of **13** printed pages and **3** blank pages.

1 Fig. 1.1 is a diagram showing the structure of a leaf under the microscope.

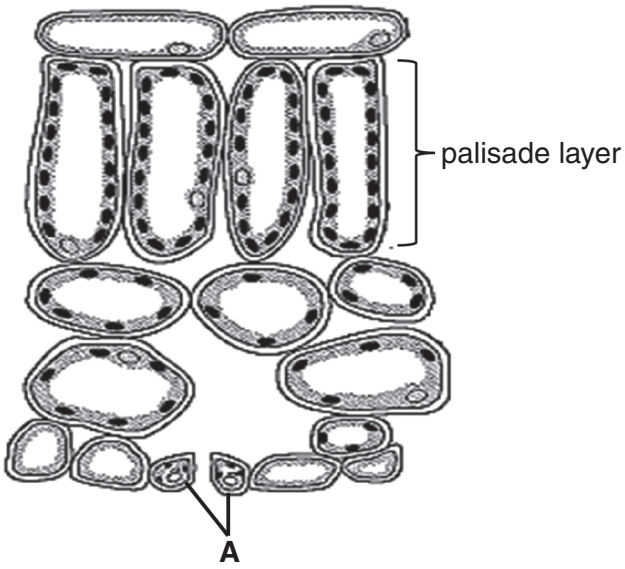

Fig. 1.1

(a) Name the part labelled **A** in Fig. 1.1.

..... [1]

(b) Describe and explain how the palisade layer is adapted for its function.

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..... [2]

(c) Describe how water from the soil gets to the palisade cells.

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..... [3]

(d) Fig. 1.2 is a graph showing the rate of photosynthesis in a plant growing in a field throughout a 12-hour period on a sunny day. The sun rose at 06:00 hrs and set at 18:00 hrs.

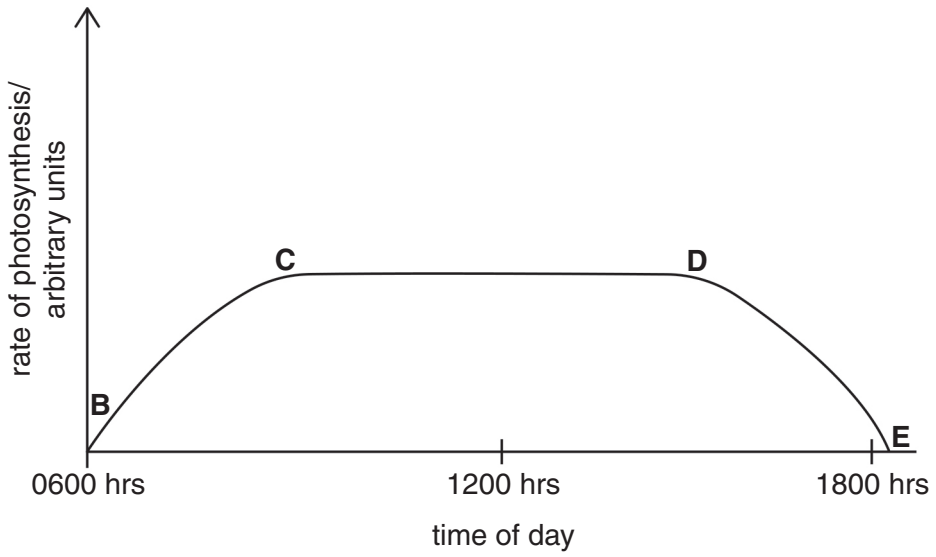

Fig. 1.2

(i) State the limiting factors at **C** and **E**.

C .....

E ..... [2]

(ii) Suggest and explain the relationship between the time of the day and the rate of photosynthesis.

between **B** and **C**

.....

.....

.....

at **E**

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..... [3]

[Total: 11]

2 **(a)** Fig. 2.1 is a diagram showing the structure of a certain type of virus known to cause an infection in humans.

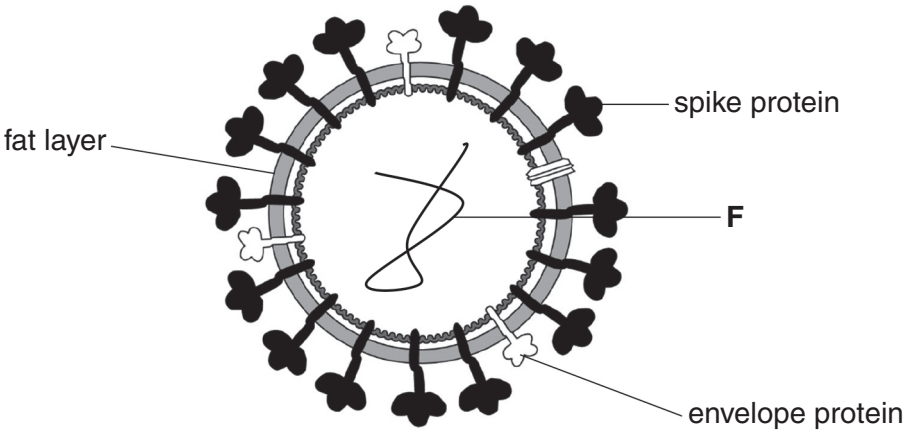

Fig. 2.1

(i) Name the part labelled **F** in Fig. 2.1.

..... [1]

(ii) One preventive measure against the spread of the virus in Fig. 2.1 is washing hands with soap and running water or using alcohol based sanitisers.

With reference to the structure of the virus in Fig. 2.1 explain why washing hands with soap or using alcohol sanitisers is effective in preventing the spread of the virus infection.

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.....

..... [2]

(iii) State **two** structural differences between the virus in Fig. 2.1 and a bacterial cell.

1 .....

2 ..... [2]

(b) In the year 2021, a vaccine was used to provide active immunity against the virus.

Describe how a vaccine can provide active immunity against a disease-causing virus.

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..... [5]

[Total: 10]

3 **(a)** Starch is both mechanically and chemically digested in the mouth.

(i) Describe and explain the process of starch digestion in the mouth.

mechanical digestion .....

.....

.....

chemical digestion .....

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..... [4]

(ii) Describe how the digested starch from the mouth moves along the oesophagus.

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.....

..... [3]

(b) Clothes can become stained.

Explain how enzymes in biological washing powders help to remove blood stains.

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..... [3]

[Total: 10]

4 **(a)** Fig. 4.1 shows the relationship between blood vessels and tissue cells.

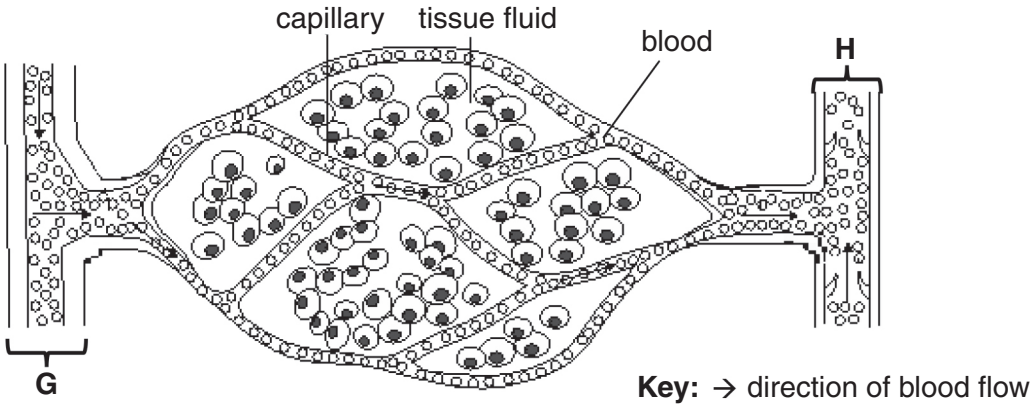

Fig. 4.1

(i) Describe how the cells in the tissue fluid get glucose from blood in the capillaries.

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..... [2]

(ii) Describe the structural differences between blood vessels **G** and **H**.

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..... [2]

(b) Describe the role of the lymphatic system in the body.

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..... [2]

(c) Blood clots can form in coronary arteries.

Explain how such blood clots can affect the heart muscle.

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..... [3]

[Total: 9]

5 A group of Form 4 pupils carried out an investigation into the effect of exercise on the rate and depth of breathing. They measured the depth of breathing in terms of the volume of air breathed in and out in a given time using the unit dm^3.

Table 5.1 shows the results of the investigation.

Table 5.1

	rate of breathing / breaths per minute	depth of breathing/dm^3
before exercise	30	3
immediately after exercise	70	6
2 minutes after exercise	50	4

(a) (i) Describe, using the information in Table 5.1, the immediate effect on the rate and depth of exercise.

.....

.....

..... [1]

(ii) Explain the immediate effect on the rate and depth of breathing.

.....

.....

.....

..... [2]

(b) Explain why the rate of breathing does not return to 30 breaths per minute immediately after exercise.

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..... [3]

(c) Fig. 5.1 is a diagram of the respiratory system in humans.

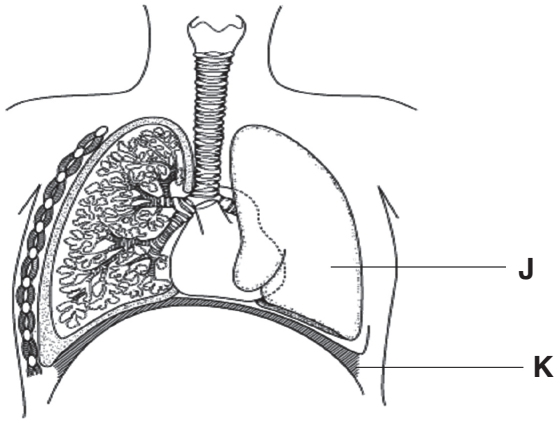

Fig. 5.1

(i) Outline the route taken by air containing oxygen from the mouth to an alveolus.

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..... [2]

(ii) State what happens to muscle **K** and pressure at **J** to cause air to be inhaled.

K .....

J ..... [2]

[Total: 10]

6 Table 6.1 shows the concentration of solutes taken from different regions, **L**, **M** and **N** of a kidney nephron where region **L** is the collecting duct.

Table 6.1

part of nephron	solute concentrations / g per 100 cm^3			
	proteins	glucose	sodium ions	urea
L	0	0	0.6	1.80
M	0	0.10	0.72	0.05
N	7	0.10	0.72	0.05

(a) Explain how the information in Table 6.1 confirms that region **L** is the collecting duct.

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..... [4]

(b) Kidneys may fail to function normally. Dialysis machines can assist people with kidney failure.

Explain why the following procedures are followed when using a kidney machine with someone whose kidneys have failed:

(i) the concentration of glucose in the dialysis fluid and in the person's blood is the same

.....

..... [1]

(ii) the used dialysis fluid is constantly being replaced with fresh dialysis fluid.

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..... [1]

[Turn over

(c) Fig. 6.1 is a graph showing changes in body temperature when a person does some strenuous exercise and then takes a cold shower.

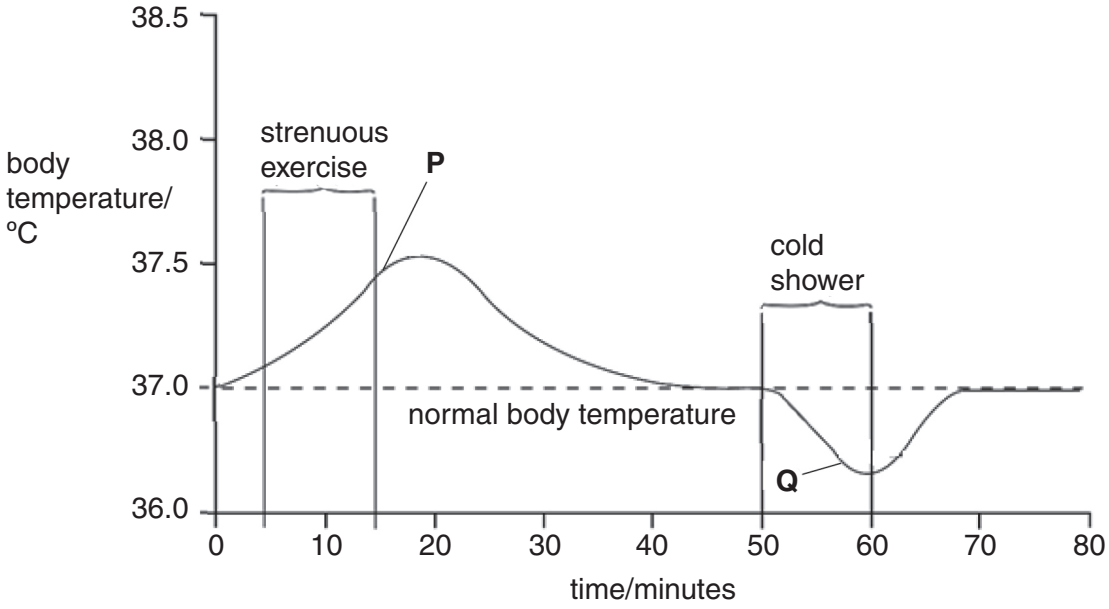

Fig. 6.1

(i) Name the part of the brain that senses the temperature changes occurring at **P** and **Q**.

..... [1]

(ii) Describe and explain the part played by the blood vessels in the skin to cause the body temperature changes between 20 and 30 minutes.

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..... [3]

[Total: 10]

7 **(a)** A chromosome is a thread of DNA.

Describe the structure of DNA.

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..... [3]

(b) Fig. 7.1 shows the stages in the production of human insulin by genetic engineering.

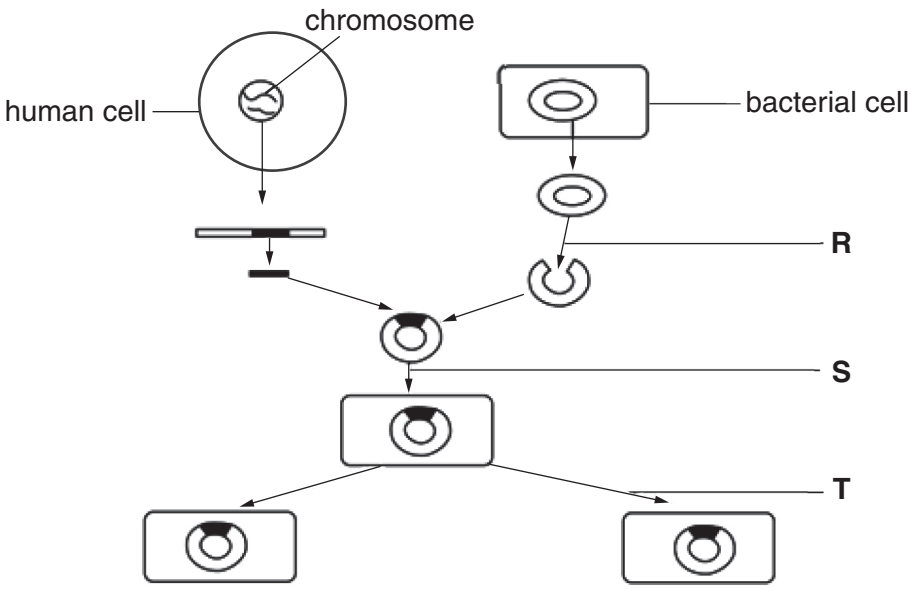

Fig. 7.1

(i) Describe what is happening at stages.

stage **R** .....

.....

stage **S** .....

.....

stage **T** .....

..... [3]

(ii) State **one** advantage of using bacteria in genetic engineering to produce insulin.

.....

..... [1]

(c) Describe how selective breeding can be used to produce cattle with higher meat yields.

.....

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..... [3]

[Total: 10]

8 **(a)** A power station burns sulfur-containing fuels to generate electricity. The smoke released from its chimneys pollutes the air.

(i) Describe and explain the harmful effect the air pollution can have on plants.

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.....

..... [3]

(ii) Suggest **one** way in which the pollution from the power station could be reduced.

.....

..... [1]

(b) Over time, nitrates in fertilisers added to the soil on farmland may be absorbed by plants or run off into nearby rivers.

(i) Describe and explain the effect on plants of growing in a soil with nitrogen deficiency.

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..... [2]

(ii) Describe and explain the effect on aquatic organisms of nitrate run off into nearby rivers.

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..... [4]

[Total: 10]

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